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REMARKS

Claims 1-7, 9-35, 39-43, 45, 47, and 49-53 are pending in the application with claims 45 and 47 amended and claims 46 and 48 canceled herein.

Claims 1-7, 9-23, 34, 35, 39-43, and 45-53 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang (U.S. Patent No. 6,878,402) in view of Werkhoven (US Publication No. 2003/0129826). Claims 24-33 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang in view of Werkhoven. Applicant requests reconsideration.

Claims 1 and 24 set forth deposition methods that include, among other features, removing heat with a thermoelectric heat pump (THP). Pages 2-3 of the Office Action allege that Chiang discloses every limitation of claims 1 and 24, except for the specific materials used and made, and relies upon Werkhoven as allegedly disclosing the missing subject matter. The Office Action further acknowledges that Chiang fails to disclose altering the first temperature by removing heat with a THP and alleges it would be obvious through routine experimentation to determine the optimum, operable heating means. Applicant traverses.

A finding of prima facie obviousness requires all of the claim limitations to be taught or suggested by the prior art. The Office Action concludes that routine experimentation may be used to discover altering the first temperature by removing heat with a THP. However, the Office Action does not allege a basis founded upon substantial evidence in support of such conclusion.

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The Office Action does not refer to any disclosure of a THP in the prior art. The Office Action does not establish any motivation to modify Chiang by combination with some teaching in the art of a THP. Applicant asserts that no suggestion in the art exists to modify Chiang to use a THP. The Office Action treats the use of a THP as though equivalent merely to selecting an optimum, though undisclosed, temperature range that may be used in a known apparatus to perform a known method. Claims 1 and 24 present quite a different circumstance by setting forth an unknown apparatus that performs an unknown method. The Office cannot merely conclude that routine experimentation may be used to discover the unknown apparatus and to perform the unknown method in the absence of substantial evidence. Consequently, the Office Action's conclusion lacks a proper foundation. At least for such reasons, claims 1 and 24 are patentable.

Also, Applicant asserts that, in the context of claims 1 and 24, the Office's allegations amount to an "obvious to try" rationale. The "obvious to try" rationale is not a proper standard for determining obviousness. In re O'Farrell, 853 F.2d 894, 901, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988); MPEP § 2145(X)(B). An improper "obvious to try" rationale results when the prior art gives only general guidance as to the particular form of an invention or how to achieve the invention and, yet, the Office alleges that exploring a new technology or general approach would seem to be a promising field of experimentation to those of ordinary skill. Id.

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At least paragraphs 26, 31, and 40 discuss several advantages of using the claimed THP. Paragraph 26 describes the characteristics of a THP. Advantages of a THP include the ability to control temperature by selectively heating or cooling with the same device such that precursors are chemisorbed or reacted at optimum temperatures. Since the timing of temperature alterations is particularly significant in ALD, a THP is very advantageous in such a setting given the quick changes in substrate temperature achievable. In all, the advantages of using a THP may yield increased deposition rates and/or increased quality of deposited materials.

Col. 7, line 52 to col. 8, line 12 of Chiang discusses a variety of considerations and devices for performing heating and cooling. However, a THP or device using similar principles of operation is noticeably absent. Also, each device listed in Chiang is either a heating device or a cooling device, but not both. Use of a THP enables a simplified apparatus and simplified processing as a result of the dual functionality of a THP.

Consequently the allegations of the Office Action constitute an improper "obvious to try" rationale since all of the devices disclosed in Chiang represent either heating or cooling devices, but not both, and none of the Chiang devices rely upon the thermoelectric effect by which a THP operates. Chiang might be considered to give general guidance for selecting heating/cooling devices, but the claimed method involves a new technology and different methodical approach to which the person of ordinary skill is not necessarily directed merely from the teachings of the cited combination.

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At least for such reasons, the Office Action fails to allege teaching or suggestion of every claimed limitation with appropriate support of the prior art. Also, the Office Action's approach amounts to an "obvious to try" rationale. Accordingly, claims 1 and 24 are patentable.

Claims 2-7 and 9-23 depend from claim 1 and claims 25-33 depend from claim 24 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested. For example, claims 3 and 31 set forth that the deposition method includes adding heat with the THP in addition to removing heat with the THP. Chiang does not disclose or suggest performing such steps nor any device capable of performing such steps. Chiang thus fails to disclose or suggest every limitation of claims 3 or 31.

Claim 34 sets forth a deposition method that includes, among other features, maintaining a substrate at a first temperature with a heater, removing heat with a device different from the heater and adding heat with the device. The device exhibits a thermoelectric effect. As may be appreciated from the discussion above regarding the deficiencies of the cited combination as applied to claims 1, 3, 24, and 31, the art fails to disclose or suggest every limitation of claim 34. Claims 35 and 39-43 depend from claim 34 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Amended claim 45 sets forth a deposition method that includes, among other features, maintaining a substrate at a first temperature with a heater,


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adding or removing heat with a device different from the heater, the device exhibiting a thermoelectric effect. As may be appreciated from the discussion above regarding the deficiencies of the cited combination as applied to claims 1 and 24, the art fails to disclose or suggest every limitation of claim 45. Claims 47 and 49-53 depend from claim 45 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Applicant herein establishes adequate reasons supporting patentability of claims 1-7, 9-35, 39-43, 45, 47, and 49-53 and requests allowance of all pending claims in the next Office Action.

Respectfully submitted,

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